

IN THE UNITED STATES PATENT OFFICE

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TITLE

INLINE CONNECTOR

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INVENTORS

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001. CROSS-REFERENCE TO RELATED APPLICATIONS

002. This application claims priority from Provisional Patent Application No. 60/450,001, filed February 26, 2003.

003. TECHNICAL FIELD

004. This invention relates to electrical connectors and more particularly to terminal connectors for coaxial cable.

005. BACKGROUND ART

006. Previous terminal connectors for coaxial cable included a metal sleeve that was crimped around the outer insulation of the cable which then had a section of the braided ground connection folded back over the metal sleeve. A male/female contact was soldered to the center conductor. An insulator was then slid over the contact, expanding to allow a contact retention feature to pass and then returning to its original shape to retain the contact. This subassembly was subsequently inserted into a metal shell, which was then hex-crimped to secure the complete assembly.

007. This connector utilized a stamped contact, which was soldered to the center conductor of the cable. The inherent variability of the solder process created both mechanical and electrical issues. The coaxial cable braid was folded back over the crimp sleeve, which allowed for the possibility of long strands, which could reach the center contact and cause a short circuit. The contact was retained by the insulator expanding to allow a first ball shape to enter the insulator. The insulator then returned to its original shape. The limited length of contact/insulator interface did not provide adequate centering for the contact. Further, the insulator provided no protection for the contact beams, which could sustain damage due to stubbing with the mating connector.

008. DISCLOSURE OF INVENTION

5 009. It is, therefore, an object of the invention to obviate the disadvantages of the prior art.

0010. It is another object of the invention to enhance coaxial cable connectors.

10 0011. These objects are accomplished, in one aspect of the invention, by the provision of an in-line coaxial cable connector that comprises a coaxial cable having a central conductor with a first section thereof exposed; an inner insulation with a second section exposed; a braided electrical conductor having a third section exposed, and an outer insulation beginning at the terminus of the third section.

15 0012. A first electrical contact has a first end affixed to the first section of exposed central conductor and has a hollow second end formed to engage a mating electrical contact.

20 0013. An electrically conductive eyelet is fitted between the inner insulation and the braided electrical conductor at the exposed third section.

0014. An electrically conductive sleeve overlies the third section and at least a portion of the outer insulation and is fixed thereto.

25 0015. An electrically insulating member is fitted over the first electrical contact and has a first end extending at least partway over the second section and a second end extending over the second end of the electrical contact. The terminus of the second end includes a lip that forms an alignment area for the reception of the mating electrical contact. An electrically conductive metal shell is positioned over the

insulating member and extends forward of the second end of the contact and rearward of the sleeve.

5 0016. The use of the metal eyelet under the braid eliminates the long strands of braid wire that could reach the center conductor and cause a short circuit and the lip formed on the terminus of the insulator provides protection for the contact beams during mating.

10 **0017. BRIEF DESCRIPTION OF THE DRAWINGS**

0018. Fig. 1 is an exploded perspective view of an embodiment of the invention; and

0019. Fig. 2 is an elevational sectional of an embodiment of the invention.

15 **0020. BEST MODE FOR CARRYING OUT THE INVENTION**

0021. For a better understanding of the present invention, together with other and further objects, advantages and capabilities thereof, reference is made to the following disclosure and appended claims in conjunction with the above-described
20 drawings.

0022. Referring now to the drawings with greater particularity, there is shown in Fig. 2 an in-line coaxial cable connector 10 comprising a coaxial cable 12 having a central conductor 14 with a first section 14a exposed, an inner insulation 16 with a second
25 section 16a exposed; a braided electrical conductor 18 having a third section 18a exposed, and an outer insulation 20 beginning at the terminus of the third section 18a. A first electrical contact 22 has a first end 24 affixed to the first section 14a of exposed central conductor 14, for example, be crimping, and has a hollow second end

26 with at least two contact beams formed to engage a mating electrical contact, not shown.

5 0023. An electrically conductive eyelet 28 is fitted between the inner insulation 16 and the braided electrical conductor 18 at the exposed third section 18a, thus avoiding the necessity of folding back the braid and creating the potential for loose wires that may cause short circuits. The eyelet 28 includes a flange 28a that serves to block and stay braids from shorting to the electrical contact 22.

10 0024. An electrically conductive sleeve 30 overlies the third section 18a and at least a portion of the outer insulation 20 and is fixed thereto, for example, by crimping. The flange 28a serves also as a locator for the sleeve 30.

15 0025. An electrically insulating member 32 is fitted over the first electrical contact and has a first end 32a extending at least partway over the second section 16a and has a second end 46 extending over the second end 26 of the first electrical contact 22. The terminus of the second end 46 includes a lip 48 forming an alignment area for the reception of the mating electrical contact. The lip 48 protects the contact beams of
20 the contact 22 and eliminates the possibility of the contact 22 mismating with its complement on a mating connector.

25 0026. An electrically conductive metal shell 34 is positioned over the member 32 and extends forward of the second end 26 of the contact 22 and rearward of the sleeve 30 and is crimped to retain its location. The outer surface of the first end 32a of the insulator 32 is provided with a plurality of crush ribs 32b which provide the friction fit of the insulator 32 in the metal shell 34.

0027. The first electrical contact 22 is preferably a screw machine part as opposed to a stamped part and has an intermediate portion 36 that is solid and comprises about 1/3 the length of the contact 22 providing exceptional stability for the contact. Additionally the outer surface 38 of the intermediate portion 36 includes a flange 42, the flange 42 operating as a positive stop that engages an interior wall 44 of the insulating member 32.

0028. To properly assemble the connector 10, the coaxial cable 12 is prepared by stripping the appropriate sections 14a, 16a and 18a. The eyelet 28 is fitted between the braid 18 and the inner insulator 16 and the electrically conductive sleeve 30 is fitted thereover and crimped in position. The first electrical contact 22 is then fitted to center conductor 14 at section 14a and crimped in place. Electrically insulating member 32 is then pressed into the electrically conductive shell 34 and then the cable end, with first electrical contact 22 in place, is inserted into insulating member 32. The cooperation of the flange 42 and the interior wall 44 insures the insertion to the proper depth. After the insertion of the first electrical contact 22 the electrically conductive shell 34 is crimped to the cable 12 to complete the assembly.

0029. While there have been shown and described what are at present considered to be the preferred embodiments of the invention, it will be apparent to those skilled in the art that various changes and modification can be made herein without departing from the scope of the invention as defined by the appended claims.